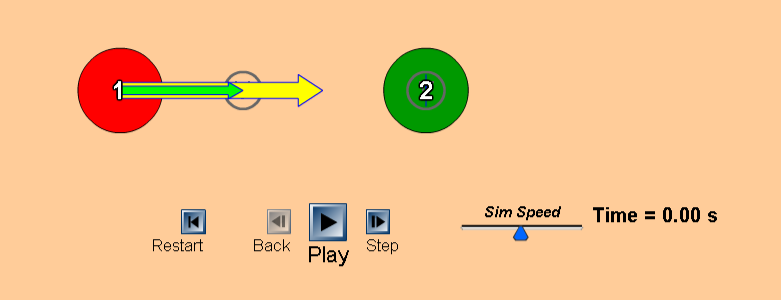
**Collision and Conservation of Momentum Lab**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Visit the website <http://phet.colorado.edu/en/simulation/collision-lab>

**You are to download this document from Mr. Alpert’s Wiki and use it to fill in your answers. When completed, send it to Mr. Alpert (halpert@latinpcs.org)**

**Part 1 Different Masses**

*In the green box on the right side of the screen, select the following settings: velocity vectors ON, Show values ON, momentum vectors ON, momenta diagram ON, elasticity 0%.*

*In the yellow box at the bottom, click on “more data.” Look at the red and green balls on the screen and the vectors that represent their motion.*

1. At the start, which ball has the greater velocity?
2. Which has the greater momentum?
3. Explain why the green ball has no momentum.

*Push “play” and let the balls collide. After they collide and you see the vectors change, click “pause”. Click “rewind” and watch the momenta box during the collision. Watch it more than once if needed by using “play”, “restart”, and “pause”. Zoom in on the vectors in the momenta box with the control on the right of the box to make it easier to see if necessary.*

1. What happens to the velocity of the red ball after the collision?
2. What about the velocity of the green ball?
3. Explain why the velocity of the two balls together slowed down?
4. Is this an elastic or inelastic collision?
5. How do you know?
6. What happens to the total momentum of both the red and green ball?

*Repeat the procedure after clicking on the box for “kinetic energy”*

1. What is the kinetic energy at the start?
2. What is the kinetic energy at the finish?
3. Is kinetic energy conserved?
4. If you said that KE is not conserved that means that some of it was “lost.” How is this possible?

**Part II Change in Masses**

*Change the mass of the red ball to match that of the green ball.*

1. Which ball has greater momentum now?
2. How has the total momentum changed?
3. Predict what will happen to the motion of the balls after they collide?
4. Watch the simulation, and then pause it once the vectors have changed.
5. What happens to the momentum of the red ball after the collision?
6. What about the green ball?
7. What about the total momentum of both the red and green ball?

**Part III: Change in elasticity**

*Now change the elasticity to 100%. Watch the simulation, and then pause it once the vectors have changed.*

1. Predict the motion of the balls after the collision.
2. What happens to the momentum of the red ball after the collision?
3. What about the green ball?
4. What about the total momentum of both the red and green ball?  
   Repeat the simulation with kinetic energy enabled.
5. Is kinetic energy now conserved?
6. Is this an elastic or inelastic collision?
7. What major difference do you now see between elastic and inelastic collisions with regard to the conservation of kinetic energy?

**Part IV: Change in elasticity to 50%**

*Change the elasticity to 50% and repeat the experiment?*

1. What happens to the velocity of each ball?
2. Is KE conserved?
3. Do you wish to modify your statement from above about conservation of KE in elastic and inelastic collisions?

**Part V**

Click on the “Advanced” function tab and arrange your two objects on a diagonal path.  
Click on the “show path” button to demonstrate the resultant of one diagonal and one horizontal collision.